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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of

PAOLA CARRAI ET AL.

Atty. Docket PHIT 000001

Serial No.: 09/759,022

Group Art Unit: 2671

Filed: January 11, 2001

Examiner: L.T. McCartney

Title: TEXT IMPROVEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Enclosed is an original plus two copies of an Appeal Brief in the above-identified patent application.

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Respectfully submitted,

By _____
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BRIEF FOR APPELLANTS

This is an appeal from the Examiner of Group 2671 finally rejecting claims 1-8 in this application.

(1) Real Party in Interest

The real party in interest in this application is U.S. PHILIPS CORPORATION by virtue of an assignment from the inventors recorded on March 26, 2001, at Reel 011701, Frame 0195,

(2) Related Appeals and Interferences

There are no other appeals and/or interferences related to this application.

(3) Status of the Claims

Claims 1-8 stand finally rejected by the Examiner.

(4) Status of Amendments

There was one (1) Response filed on October 14, 2003, after final rejection of the claims on September 15, 2003, which was considered by the Examiner.

(5) Summary Of The Invention

The subject invention relates to improving the appearance of text in an image displayed on a matrix-type display. As described in the Substitute Specification on page 2, paragraph [0004], digital display devices are frequently matrix devices where a scaling system is used to change the format of the input video/graphic signal so that it satisfies the size of the device. However, this scaling has a disturbing effect on the appearance of text that may be in the displayed image. In order to alleviate this condition, the subject invention, as shown in Fig. 4, and described in the Substitute Specification on page 14, paragraph [0036], analyzes an input image signal InIm:s and detects text areas in the input image signal in a text detector part Det. Then, the subject invention scales the whole of the image signal such that it fits the size of the display device in scaler Scal. Then, the subject invention, in post-processing part Post-proc, post processes the

scaled image signal only in those regions which have been detected as text regions in the text detector part Det. This post-processing is performed to improve the readability of the text in the text regions while leaving the rest of the displayed image unaffected.

(6) Issues

(A) Whether the invention, as claimed in claims 1, 7 and 8, is anticipated, under 35 U.S.C. 102(e), by U.S. Patent 6,067,070 to Suzuki et al.

(B) Whether the invention, as claimed in claim 2, is unpatentable, under 35 U.S.C. 103(a), over Suzuki et al. in view of U.S. Patent 5,956,468 to Ancin.

(C) Whether the invention, as claimed in claim 3, is unpatentable, under 35 U.S.C. 103(a), over Suzuki et al. in view of U.S. Patent 6,038,340 to Ancin et al. and further in view of Ancin.

(D) Whether the invention, as claimed in claim 4, is unpatentable, under 35 U.S.C. 103(a), over Suzuki et al. in view of U.S. Patent 6,148,102 to Stolin.

(E) Whether the invention, as claimed in claim 5, is unpatentable, under 35 U.S.C. 103(a), over Suzuki et al. in view of the article "Thresholding and Enhancement of Text Images for Character Recognition" to W.W. Cindy Jiang, and further in view of U.S. Patent 5,781,658 to O'Gorman.

(F) Whether the invention, as claimed in claim 6, is unpatentable,

under 35 U.S.C. 103(a), over Suzuki et al. in view of Jiang.

(7) Grouping Of Claims

Appellants assert that claims 1, 7 and 8 stand and fall together, while claims 2-6 stand and fall separately.

(8) Arguments

(A) The Suzuki et al. patent discloses a display control apparatus having a display of text data and image data and a display control method for the same, in which, in a signal, it is detected whether a region is or is not a text region. If the region is a text region, scaling is performed with a scale down percentage of 66%, and if the region is not a text region, scaling is performed with a scale down percentage of 50%. Then, regardless of which scaling is performed, it is determined if the entire text or image data is displayable in the allotted region on the display. If not, a scroll bar is added to the displayed image allowing a user to scroll the display in each allotted region enabling the viewing of the entire text or image data.

As described above, the subject invention relates to a process for improving text as a part of an image signal. To that end, the signal is analyzed to detect text regions (as in Suzuki et al.). However, in the subject invention, the entire image signal is then subjected to scaling in order to match the image signal with a

display on which the image signal is to be displayed. As such, an entire frame of the image signal will then be displayed on the display, as opposed to a partial frame of the image signal (as in Suzuki et al.). Then, the scaled signal is post-processed in dependence on the detected text regions, i.e., the scaled image signal is subjected to post-processing (e.g., binarization) in only the detected text regions to thereby improve the readability of the text.

Appellants submit that Suzuki et al. does not show or suggest "scaling the image to adjust first numbers of pixels per line and lines per image of the image to second numbers of pixels per line and lines per image that fit in a display on which the image is to be displayed". Rather, Suzuki et al. selectively scales text areas by one fixed percentage (e.g., 66%), and image data by a second fixed percentage (e.g., 50%), and there is no suggestion in Suzuki et al. that these percentages are based on enabling the image to fit in a display on which the image is to be displayed. Rather, Suzuki et al. particularly addresses the situation where the display text (or image) region is too small for the text (or image) area, i.e., Suzuki et al. selectively adds scrolling buttons.

The Examiner states:

> "... however, Suzuki discloses adjusting the number of pixels per line and lines per image (column 7, line 58 - column 8, line 58) and that the adjusted image fits a display on which the image is to be displayed (column 2, lines 47-50; Figs. 4, 5, and 6.)...
> "As can be seen in Fig. 1 of Suzuki, steps S5-S18 all

occur in dependence of the result of step S4, the text detecting step, i.e. the text detecting step must occur and produce a result before steps S5-S18 can occur."

For a better understanding of Suzuki et al., Appellants refer to col. 2, lines 15-23 which states:

> "In order to accomplish the above object, the display control apparatus in accordance with the present invention controls a display section so that the display section can carry out a mixed one-sight display of text data and image data by dividing a screen of the display section into a plurality of scale-down display areas, scaling down the text data and the image data, and then displaying either the scaled-down text data or the scaled-down image data in each of the areas…."

From the above, it should be plain that Suzuki et al. separates text portions of the input data signal from the image (or graphic) portions, subjects the text portions to a different scaling than the image portions, and displays the scaled-down text portions in a different display area than the scaled-down image portions. The Suzuki et al. apparatus then includes up/down scroll buttons for both the text and image portions display areas allowing a user to see all of the data. As such, Suzuki et al. does not scale the "image" to adjust first numbers of pixels per line and lines per image of the image to second number of pixels per line and lines per image that fit in a display on which the image is to be displayed. Rather, Suzuki et al. separately scales the text in an image at one rate, and the graphics in an image at another rate, in order to fit the text in one display area of a display, and the graphics in another display area of a display.

Appellants further submit that it should be apparent that the detecting of text data only affects the percentage of scaling. After the scaling, there is no processing in dependence on a result of the text detecting step. Rather, as shown in Fig. 1 of Suzuki et al., after both the scaling of the text data (S5) and the scaling of the image data (S12), the same steps are performed, i.e., S6/S12 - "ALL DATA DISPLAYED?", and S7/S13 - "DISPLAY BAR TO INDICATE EXISTENCE OF HIDDEN TEXT". Hence, in Suzuki et al., all of the data is processed to selectively add scroll buttons to the relevant display area.

(B) Appellants above arguments with regard to Suzuki et al. are incorporated herein.

The Ancin patent discloses a document segmentation system in which a signal having both text and image regions is analyzed. The text regions are detected (i.e., "The method and apparatus then detect dark text pixels on a light background region of a document and assign segmentation labels to each pixel.") As further stated in the Abstract, "The pixel labels are post-processed using a plurality of syntactic rules to correct mislabeling of pixels." Further, "Pixels identified as being in the background region of the document are assigned a white label and pixels identified as being in the text region are assigned a black label."

Claim 2 states "the detecting step comprises setting a

background color to white, and a text color to black; and the processing step comprises the step of setting white back to the background color, and setting black back to the text color." Appellants submit that Ancin only changes the text to black and the background to white. Ancin neither shows nor suggests that this should be done in a pre-scaling step, and that in a post-scaling step, the text and background should be returned to their previous colors.

With regard to Ancin, the Examiner states:

> "Ancin discloses changing the text to black and the background to white in a low resolution preview of the document, i.e., prescaling (column 10, lines 39-43; column 11, lines 16-25) and returning the text and backgroudn [sic] colors to their previous colors in a post-scaling step in a high resolution version of the same document (column 10, lines 48-50; column 11, lines 41-45; column 18, lines 7-41)."

First, Appellants would like to point out that in Ancin, the document is scanned twice, once at a low resolution and once at a high resolution (col. 10, lines 40-45). As such, there are **two** image signals, in which the low resolution image signal may be used as a preview document (lines 51-52). According to Fig. 4, and col. 10, line 65 to col. 11, line 53, the low resolution image signal is analyzed to determine whether the document contains dark colored text on a light background, and then generates a table of white point compensation values (i.e., the labels black (B), white (W) and color (C) are used to mark text, background, and image regions of the mixed color document). This table is then applied to the

high resolution image signal such that the text areas are converted to black, the background areas are converted to white, and the color areas are kept the same.

Appellants submit that this is completely different from that which is claimed in claim 2, i.e., in the text detecting step, in a detected text region, the background color is changed to white, while the text color is changed to black, and then in the processing step, in the text region, the background is changed back to its original color and the text is changed back to its original color.

Furthermore, Appellants submit that Ancin does not supply that which is missing from Suzuki et al., i.e., scaling the entire signal after detection of the text regions, the scaling being performed such that the image of the signal fits in a display on which the image is to be displayed, and then post-processing the scaled signal in dependence on the previously detected text regions.

(C) Appellants above arguments with regard to Suzuki et al. and Ancin are incorporated herein.

The Ancin et al. patent discloses a system and method for detecting the black and white points of a color image, in which, in a particular region, the number of black pixels is compared to the number of white pixels to determine whether that region is a text

region.

However, Appellants submit that Ancin et al. or Ancin, either individually or collectively, do not supply that which is missing from Suzuki et al., i.e., scaling the entire image signal after detection of the text regions, the scaling being performed such that the image of the signal fits in a display on which the image is to be displayed, and then post-processing the scaled signal in dependence on the previously detected text regions.

(D) Appellants above arguments with regard to Suzuki et al. are incorporated herein.

The Stolin patent discloses recognizing text in a multicolor image, in which, in detecting text, "the image is separated into multiple blocks. Color distribution of each of the blocks are analyzed, and blocks having two main colors are identified. The two-color blocks having similar colors are grouped into two-color zones, and text in the two-color zones are identified."

However, Appellants submit that Stolin does not supply that which is missing from Suzuki et al., i.e., scaling the entire signal after detection of the text regions, the scaling being performed such that the image of the signal fits in a display on which the image is to be displayed, and then post-processing the scaled signal in dependence on the previously detected text regions.

(E) Appellants above arguments with regard to Suzuki et al. are incorporated herein.

The Jiang article discloses "Each sub-pixel in the interpolated graytone image has an associated threshold … If a sub-pixel intensity is larger than its threshold, binarize it into a black sub-pixel; otherwise make it a white sub-pixel."

The O'Gorman patent discloses a method of thresholding document images. It appears that the Examiner is using the O'Gorman patent that the suggestion/motivation for using Jiang would have been because thresholding can realize an image that can be efficiently stored for future access and reading.

However, as Applicants noted above with respect to the other references, the combination of Jiang and O'Gorman do not supply that which is missing from Suzuki et al., i.e., scaling the entire signal after detection of the text regions, the scaling being performed such that the image of the signal fits in a display on which the image is to be displayed, and then post-processing the scaled signal in dependence on the previously detected text regions.

(F) Appellants above arguments with regard to Suzuki et al. and Jiang are incorporated herein, that is, Jiang does not supply that which is missing from Suzuki et al., i.e., scaling the entire

signal after detection of the text regions, the scaling being performed such that the image of the signal fits in a display on which the image is to be displayed, and then post-processing the scaled signal in dependence on the previously detected text regions.

(9) Conclusion

Based on the above arguments, Appellants believe that the subject invention is not rendered obvious by the prior art and is patentable thereover. Therefore, Appellants respectfully request that this Board reverse the decisions of the Examiner and allow this application to pass on to issue.

Respectfully submitted,

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(10) Appendix

CLAIMS ON APPEAL

1. (Previously Presented) A method of text improvement, the method comprising the steps of:

detecting text in an image;

scaling the image to adjust first numbers of pixels per line and lines per image of the image to second numbers of pixels per line and lines per image that fit in a display on which the image is to be displayed; and

processing the image after having been scaled in dependence on a result of the text detecting step.

2. (Previously Presented) The method as claimed in claim 1, wherein the detecting step comprises setting a background color to white, and a text color to black; and the processing step comprises the step of setting white back to the background color, and setting black back to the text color.

3. (Previously Presented) The method as claimed in claim 1, wherein the detecting step comprises determining whether a number of picture units of the text color is fewer than a number of picture units of the background color.

4. (Previously Presented) The method as claimed in claim 1, wherein the detecting step comprises determining a region for which a number of colors does not exceed 2.

5. (Previously Presented) The method as claimed in claim 1, wherein the processing step comprises subjecting the scaled image to a thresholding operation.

6. (Previously Presented) The method as claimed in claim 1, wherein the processing step comprises subjecting the scaled image to a morphological filtering.

7. (Previously Presented) A device for text improvement, the device comprising:

means for detecting text in an image;

means for scaling the image to adjust first numbers of pixels per line and lines per image of the image to second numbers of pixels per line and lines per image that fit in a display on which the image is to be displayed; and

means for processing the image after having been scaled in dependence on a result of the text detecting means.

8. (Previously Presented) A display apparatus, comprising:

the device for text improvement as claimed in claim 7; and

a display.